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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/751,453	01/02/2001	Kee Jeung Lee	M 275264 HD943/US	7152

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EXAMINER

RAO, SHRINIVAS H

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 08/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,453

Applicant(s)

LEE ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

R sponse to Am ndment

Applicants' amendment filed June 12, 2002 has been entered on June 24, 2002. Therefore claims 1, 2, 19 and 20 as amended by the amendment and claims 3-18 as originally filed are currently pending in the application.

Drawings

The informal drawings filed on January 02, 2001 have been objected to by the draftsman for reasons set out in the enclosed PTO-948.

Applicants' are reminded that drawing corrections can no longer be held in abeyance.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Boer et al. (U.S. Patent No. 5,910,880, herein after De Boer) for reasons previously set out and incorporated here by reference for the sake of brevity and for the reasons set out below.

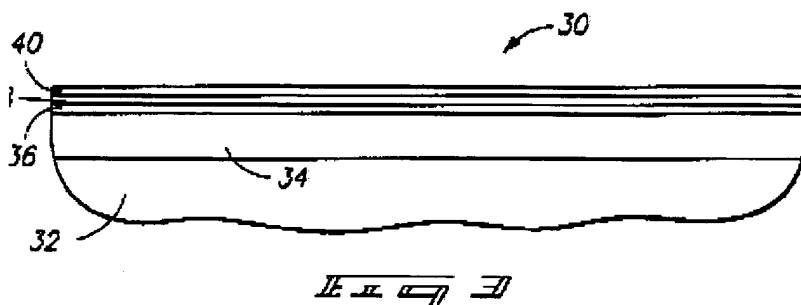
With respect to claim 1, Applicants' contend that

Applicants' state that their claim 1 recites, " Claim 1 recites in part, a method of fabricating a capacitor comprising forming a first amorphous TaON thin film on a lower electrode."

As seen from the above applicants' claim language does not recite the first amorphous TAON layer being directly upon the lower electrode thus including devices having other intermediate layers.

Applicants' next contend that " DeBoer does not teach or suggest that an amorphous TaON thin film is formed on the lower electrode as recited in claim1".

However, DeBoer in fig.3 shows



and in col. 2 lines 15-17 (describing prior art) states :

¹³ polysilicon. It is noted that the top electrode of the Ta_2O_5 capacitor can comprise only TiN or WN layer 20, or can comprise the layer 20 and layer 22 stack.

Therefore it is known in the prior art that the dielectric layer may comprise of a plurality of layers.

In col. 3 lines 65-to col. 4 line 5 states :

Referring to FIG. 3, a second tantalum-comprising layer 40 is formed over first tantalum-comprising layer 38. Sec-

ond tantalum-comprising layer 40 is a barrier layer preferably comprising tantalum and nitrogen, such as in the form Ta_2N . Second tantalum-comprising layer 40 can additionally comprise oxygen, and may, for example, comprise a compound having the general formula $Ta_xO_yN_z$.

The value for x, y, and z all being one (1) is not excluded, therefore if the value of x,y, and z is one the formula will be TaON.

It is noted that the previous rejection referred to layer (namely # 40) and layer 38 mentioned by the applicants.

Applicants' next argue that DeBoer does not teach an amorphous TaON thin film over the lower electrode.

Firstly it is noted that , the amorphous layer is an intermediate step and as recited in 7-9 and described in the specification page 13 lines 20-25 :

" Thus, the first and second amorphous TaOn thin films 32a and 32b provide a dielectric film having a high film quality after being subjected to the annealing process that induce crystallization of the amorphous structure and remove carbon atoms.'

Thus in the final step both the layers are crystallized.

Further DeBoer in col. 4 lines 34-45 states :

C. It is noted that, as discussed above, Ta_2O_5 transforms
5 from an amorphous material to a crystalline material at
about 600° C. Accordingly, it may be desired to utilize a
hydrazine-comprising gas for forming second tantalum-
comprising layer 40 when it is desired to keep Ta_2O_5 layer
38 in an amorphous form. In contrast, it may be desired to
5 utilize an ammonia-comprising gas when it is desired to
convert an amorphous Ta_2O_5 layer 38 to a crystalline form.
Methods for exposing a wafer surface to hydrazine,
ammonia, NF_3 and/or hydrazoic acid in a semiconductor
processing reactor at the above-discussed temperatures are
5 known to persons of ordinary skill in the art.

which is exactly the same as applicant's recitation.

Therefore all of Applicants' contentions are considered in detail but however not found to be persuasive.

Claims 2-4 were said to be allowable as they depend upon allegedly allowable claim 1.

However, as shown above claim 1 is not allowable, therefore claims 2-4 are also not allowable and rejected for reasons previously set out and those set out herein above.

B. Claims 5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Boer et al. (U.S. Patent No. 5,910,880, herein after De Boer) as applied to claims 1-4 above and in view of Yang et al. (U.S. Patent No. 5,956,594, herein after Yang) for reasons previously set out and incorporated here by reference for the sake of brevity and for the reasons set out below.

Claims 5-18 were alleged to be allowable for at least the reasons presented above with regard to claim 1.

However as shown above claim 1 is not allowable and therefore claims 5-18 are also not allowable and are rejected for reasons previously set out and those set out herein above.

Claims 19 and 20 were alleged to be allowable because they recite, " forming an amorphous TaON thin film on the lower electrode as recited in claim 1. Since neither DeBoer (as established above) or Yang teach forming the TaON layer on the lower electrode, no combination of these two references teaches or suggests forming a TaON thin film on the lower electrode."

However as shown above in the discussion regarding claim 1, DeBoer does teach forming the TaON layer on the lower electrode

Therefore claims 19 and 20 are rejected for reasons previously set out and those set out herein above.

R sponds to Arguments

Applicant's arguments filed 6/24/02 have been fully considered but they are not persuasive. for reasons set out at length above.

As the same references as previously applied are also applied in this rejection this forms a separate basis for making this action Final.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (703) 3065945. The examiner can normally be reached on 8.00 to 5.00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703)3062794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 7463926 for regular communications and (703) 872-9319 for After Final communications.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 3067722.



Steven H. Rao

Patent Examiner

August 12, 2002



Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800